

## PATENT ABSTRACTS OF JAPAN

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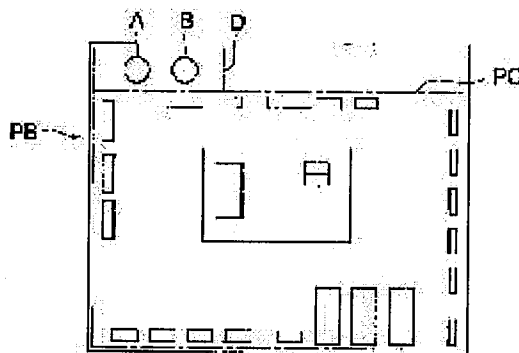
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(54) EQUIPMENT, ELECTRICAL SUBSTRATE AND METHOD FOR INSPECTING THE SAME

(57)Abstract:

PROBLEM TO BE SOLVED: To solve the problem tat the qualities of reused electrical substrates fluctuate when the substrates are classified with low classifying efficiency, because the usability of used electrical substrates is not discriminated easily at the time of classifying the substrates.

SOLUTION: An indicating means which indicates the number of used times of a mounting substrate is installed to the substrate.



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**CLAIMS**

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[Claim(s)]

[Claim 1] An electronic circuit board having a displaying means which displays a use count.

[Claim 2] The electronic circuit board according to claim 1, wherein said displaying means consists of a hole for a checking jig.

[Claim 3] The electronic circuit board according to claim 2, wherein said hole is circular.

[Claim 4] The electronic circuit board according to claim 2, wherein said hole is an ellipse form.

[Claim 5] The electronic circuit board according to claim 2, wherein said hole is a rectangle.

[Claim 6] An electronic circuit board having a field in which a displaying means which displays a use count can be provided.

[Claim 7] Apparatus, wherein an electronic circuit board which has a displaying means which displays a use count is provided.

[Claim 8] The apparatus according to claim 7, wherein said displaying means consists of a hole for a checking jig.

[Claim 9] The apparatus according to claim 7, wherein said hole is circular.

[Claim 10] The apparatus according to claim 7, wherein said hole is an ellipse form.

[Claim 11] The apparatus according to claim 7, wherein said hole is a rectangle.

[Claim 12] Apparatus having an electronic circuit board which has a field in which a displaying means which displays a use count can be provided.

[Claim 13] An inspection method of an electronic circuit board providing the 2nd hole in the 2nd position of an electronic circuit board by which the 1st hole for a checking jig is provided in the 1st position, and inspecting a reuse electronic circuit board.

[Claim 14] An electronic circuit board having a displaying means which indicates that contains the precious metals and it contains the precious metals.

[Claim 15] The electronic circuit board according to claim 14, wherein said displaying means displays content for every kind of precious metals to contain.

[Claim 16] The electronic circuit board according to claim 14 or 15, wherein said precious metals are at least one of gold, silver, platinum, and the tungsten.

[Claim 17] An electronic circuit board given in any 1 paragraph of claims 14-16 characterized by what said displaying means was formed for of silk printing.

[Claim 18] An electronic circuit board given in any 1 paragraph of claims 14-16, wherein said displaying

means is formed by carrying out sculpture processing of said electronic circuit board.

[Claim 19]An electronic circuit board given in any 1 paragraph of claims 14-16 characterized by what said displaying means was formed for by printing which used oily ink.

[Claim 20]Apparatus, wherein an electronic circuit board which has a displaying means which indicates that contains the precious metals and it contains the precious metals is provided.

[Claim 21]The apparatus according to claim 20, wherein said displaying means displays content for every kind of precious metals to contain.

[Claim 22]The apparatus according to claim 20 or 21, wherein said precious metals are at least one of gold, silver, platinum, and the tungsten.

[Claim 23]Apparatus given in any 1 paragraph of claims 20-22 characterized by what said displaying means was formed for of silk printing.

[Claim 24]Apparatus given in any 1 paragraph of claims 20-22, wherein said displaying means is formed by carrying out sculpture processing of said electronic circuit board.

[Claim 25]Apparatus given in any 1 paragraph of claims 20-22 characterized by what said displaying means was formed for by printing which used oily ink.

[Claim 26]An electronic circuit board having a displaying means which distinguishes whether lead content solder is used or non-lead solder is used.

[Claim 27]The electronic circuit board according to claim 26, wherein said displaying means consists of a displaying means which indicates that non-lead solder is used.

[Claim 28]The electronic circuit board according to claim 26 or 27, wherein said displaying means consists of a displaying means which indicates that lead content solder is used.

[Claim 29]Apparatus, wherein an electronic circuit board which has a displaying means which distinguishes whether lead content solder is used or non-lead solder is used is provided.

[Claim 30]The apparatus according to claim 29, wherein said displaying means consists of a displaying means which indicates that non-lead solder is used.

[Claim 31]The apparatus according to claim 29 or 30, wherein said displaying means consists of a displaying means which indicates that lead content solder is used.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to recycling of an electronic circuit board especially about the apparatus by which the electronic circuit board and this electronic circuit board were provided. As such apparatus, a computer, computer-related peripherals, a copying machine, a facsimile, a printer, telephone, television, an electric washing machine, an air conditioner, etc. are typical.

[0002]

[Description of the Prior Art](1) In the above mentioned apparatus, including the reuse of an electronic circuit board, i.e., a used electronic circuit board, in a new product, and carrying out a reuse is performed in the part.

[0003](2) The electrical part mounted in an electronic circuit board does not have few things containing the precious metals, such as gold, silver, platinum, and tungsten. For this reason, processing the electronic circuit board which was separated from apparatus and collected, and extracting and recycling the precious metals is performed.

[0004](3) Since lead which is one of the ingredients of the solder which connects between the circuits on an electronic circuit board is a harmful substance, When [ which lays on the shelf of an electronic circuit board ] it case or recycles, processing of lead has been a problem, and the solder which does not contain lead which is a harmful substance as a measure on this problem, i.e., Handaya which consists of silver / a tin system alloy, and the solder which consists of zinc / a tin system alloy are used in part.

[0005]

[Problem(s) to be Solved by the Invention](1) In the process of the reuse which carries out the reuse of the electronic circuit board, the propriety of the reuse was conventionally inspected about the total of the electronic circuit board which disassembled and classified apparatus. Therefore, the number of subjects of examination increased and there was a problem that working efficiency was low. The quality of the classified reuse electronic circuit board became irregular, and there was a problem of reducing the reliability of the apparatus by which the reuse electronic circuit board was incorporated.

[0006]The purpose of the 1st this invention is as follows.

Improve the judgment efficiency of a reuse electronic circuit board for the purpose of solving the aforementioned problem in the reuse of an electronic circuit board.

Improve the quality of the classified reuse electronic circuit board.

[0007](2) As a substance which the circuit on an electronic circuit board comprises a wire etc. which connect IC, a resistor, a capacitor, printed wiring, and a circuit element and printed wiring, and constitutes a circuit, That for which the precious metals other than ceramics, such as a silicon wafer, and copper, such as gold, silver, platinum, and tungsten, are used is not little. These precious metals are collected and recycled.

[0008]The electronic circuit board is various, such as what does not contain the precious metals, a thing which does not reach the content corresponding to recovery cost even if contained, and a thing of the content corresponding to recovery cost. The electronic circuit board which depends on experience of the worker who classifies an electronic circuit board, and intuition conventionally, and contains the precious metals was classified. For this reason, there was a problem that the accuracy of judgment was low and judgment work was not efficient.

[0009]The purpose of the 2nd this invention aims at solving the aforementioned problem in recovery of the precious metals from the conventional electronic circuit board.

[0010](3) The substance contained in an electronic circuit board is recycled, and when laying on the shelf of the remainder, or when laying on the shelf of an electronic circuit board, the lead contained in waste has been a problem.

[0011]Although lead is the main ingredients of the solder which connects between wiring, the solder which does not contain lead as a measure on the aforementioned problem, i.e., lead-free soldering, is developed. However, since it was difficult to distinguish from appearance the electronic circuit board which has the electronic circuit board which has lead content solder and the solder which does not contain lead, i.e., lead-free soldering, it was difficult to classify the electronic circuit board which used lead-free soldering. For this reason, the advantage of lead-free soldering is not fully utilized, but there is a problem that use of lead-free soldering does not progress.

[0012]By making easy discrimination of an electronic circuit board which has lead-free soldering, the purpose of the 3rd this invention promotes use of lead-free soldering, and aims at contributing to solution of the environmental problem relevant to solder.

[0013]

[Means for Solving the Problem]The purpose of this invention is attained by the following invention.

[0014]1. Electronic circuit board having displaying means which displays use count.

2. Electronic circuit board given in said 1, wherein said displaying means consists of hole for checking jig.

[0015]3. Electronic circuit board given in said 2, wherein said hole is circular.

4. Electronic circuit board given in said 2, wherein said hole is ellipse form.

[0016]5. Electronic circuit board given in said 2, wherein said hole is rectangle.

6. Electronic circuit board having field in which displaying means which displays use count can be provided.

[0017]7. Apparatus, wherein electronic circuit board which has displaying means which displays use count is provided.

[0018]8. Apparatus given in said 7, wherein said displaying means consists of hole for checking jig.

[0019]9. Apparatus given in said 7, wherein said hole is circular.

10. Apparatus given in said 7, wherein said hole is an ellipse form.

[0020]11. Apparatus given in said 7, wherein said hole is a rectangle.

12. Apparatus having an electronic circuit board which has a field in which a displaying means which

displays a use count can be provided.

[0021]13. An inspection method of an electronic circuit board providing the 2nd hole in the 2nd position of an electronic circuit board by which the 1st hole for a checking jig is provided in the 1st position, and inspecting a reuse electronic circuit board.

[0022]14. An electronic circuit board having a displaying means which indicates that contains the precious metals and it contains the precious metals.

[0023]15. An electronic circuit board given in said 14, wherein said displaying means displays content for every kind of precious metals to contain.

[0024]16. An electronic circuit board given in said 14, wherein said precious metals are at least one of gold, silver, platinum, and the tungsten, or said 15.

[0025]17. An electronic circuit board given in said any 1 paragraph of 14-16 characterized by what said displaying means was formed for of silk printing.

[0026]18. An electronic circuit board given in said any 1 paragraph of 14-16, wherein said displaying means is formed by carrying out sculpture processing of said electronic circuit board.

[0027]19. An electronic circuit board given in said any 1 paragraph of 14-16 characterized by what said displaying means was formed for by printing which used oily ink.

[0028]20. Apparatus, wherein an electronic circuit board which has a displaying means which indicates that contains the precious metals and it contains the precious metals is provided.

[0029]21. Apparatus given in said 20, wherein said displaying means displays content for every kind of precious metals to contain.

[0030]22. Apparatus given in said 20, wherein said precious metals are at least one of gold, silver, platinum, and the tungsten, or said 21.

[0031]23. Apparatus given in said any 1 paragraph of 20-22 characterized by what said displaying means was formed for of silk printing.

[0032]24. Apparatus given in said any 1 paragraph of 20-22, wherein said displaying means is formed by carrying out sculpture processing of said electronic circuit board.

[0033]25. Apparatus given in said any 1 paragraph of 20-22 characterized by what said displaying means was formed for by printing which used oily ink.

[0034]26. An electronic circuit board having a displaying means which distinguishes whether lead content solder is used or non-lead solder is used.

[0035]27. An electronic circuit board given in said 26, wherein said displaying means consists of a displaying means which indicates that non-lead solder is used.

[0036]28. An electronic circuit board given in said 26, wherein said displaying means consists of a displaying means which indicates that lead content solder is used, or said 27.

[0037]29. Apparatus, wherein an electronic circuit board which has a displaying means which distinguishes whether lead content solder is used or non-lead solder is used is provided.

[0038]30. Apparatus given in said 29, wherein said displaying means consists of a displaying means which indicates that non-lead solder is used.

[0039]31. Apparatus given in said 29, wherein said displaying means consists of a displaying means which indicates that lead content solder is used, or said 30.

[0040]

[Embodiment of the Invention](1) Embodiment 1 drawing 1 is an electronic circuit board concerning the embodiment of the invention 1.

[0041]PB is an electronic circuit board and circuit area PC in which circuit elements, such as IC, a resistor, a capacitor, and a coil, printed wiring, and a wiring wire have been arranged is provided. In this Embodiment 1, the field D for providing the hole for inserting an inspecting jig (not shown) is formed at the time of the inspection of a reuse (reuse) electronic circuit board other than circuit area PC.

[0042]The electronic circuit board PB of the graphic display is designed use it 3 times. The holes A and B are not formed in the 1st use PB of the electronic circuit board PB, i.e., an intact electronic circuit board. in the 2nd use, i.e., the 1st reuse, -- the 1st hole for the inspection of the reuse electronic circuit board PB -- A is drilled by the 1st position and an inspection is conducted. At the time of the 3rd use, i.e., the 2nd reuse, the hole A is formed in the electronic circuit board PB. and -- in the inspection for the 3rd reuse -- the 2nd hole -- B is drilled by the 2nd position and an inspection is conducted. Therefore, when the holes A and B exist in the electronic circuit board classified by demolition when 3 times use was an electronic circuit board of a limit, the electronic circuit board PB is used 3 times, is nonreusable and is not classified as reuse parts. Thus, it is a displaying means which shows that the holes A and B are not only used for checking, but it is a reuse electronic circuit board, and this displaying means enables it ease and to classify a reuse electric equipment article promptly and correctly.

[0043]Although the example in which the circular holes A and B are drilled is shown in the graphic display, it can be considered as the shape of having been suitable for inspecting jigs, such as an ellipse form and a rectangle.

[0044](2) Embodiment 2 drawing 2 is a figure showing the electronic circuit board concerning the embodiment of the invention 2.

[0045]The field E is formed out of circuit area PC of the electronic circuit board PB, and the kind and content of the precious metals which the electronic circuit board PB has are displayed on the label F as a displaying means stuck on the field E by silk printing like "70 mg of gold."

[0046]As a displaying means, the kind and content of the precious metals are displayed by sculpture processing instead of the label F. Or the kind and content of the precious metals may be directly displayed on the field E using oily ink. There are gold, silver, platinum, tungsten, etc. as the precious metals to display.

[0047]Thus, since the kind and content of the content precious metals are displayed on the electronic circuit board PB which has the precious metals, the electronic circuit board which can reuse the precious metals, and an impossible electronic circuit board can be classified clearly. Since content is displayed, also when the extraction art of the precious metals has a difference, the judgment corresponding to art is attained and effective reuse of the precious metals is performed.

[0048](3) Embodiment 3 drawing 3 is a figure showing the electronic circuit board concerning the embodiment of the invention 3.

[0049]The electronic circuit board PB of a graphic display as solder which connects printed wiring, a circuit element or printed wiring, and a path cord, The solder which does not contain lead, such as silver / tin alloy, or zinc/tin alloy, without using lead/tin alloy, That is, lead-free soldering is used, the field G other than circuit area PC of the electronic circuit board PB is formed, and "lead-free soldering use" is displayed on the label H as a displaying means stuck on the field G by silk printing.

[0050]As a displaying means, lead-free soldering use may be displayed instead of the label H by sculpture processing. It may display direct "lead-free soldering use" on the field G using oily ink. Although it is good for the electronic circuit board PB which uses lead content solder as usual also as a gestalt which does not display, "lead content solder use" may be displayed and it may distinguish from "lead-free soldering use" clearly.

[0051]In the processing which collects the precious metals from the discarding treatment of an electronic circuit board or the electronic circuit board of lead-free soldering use by displaying lead-free soldering like a graphic display, or recycles the epoxy resin which is a supporting board of an electronic circuit board, Since it is not necessary to perform treatment to lead, it becomes possible to fully pull out the environmental-contamination-prevention function of lead-free soldering.

[0052]

[Effect of the Invention]One invention of claims 1-13 enables it to classify a reuse electronic circuit board efficiently, and the quality of the collected reuse electronic circuit board improves, and the reuse (reuse) of an electronic circuit board is promoted.

[0053]Since a displaying means is established in relation to an inspection process by claim 2 or the invention of 8, without providing the addition for a use count display, at the time of recycling of an electronic circuit board, or abandonment, it is avoided that an impurity mixes and the display of a reuse is ensured.

[0054]ease [ judgment of the electronic circuit board which contains the precious metals by one invention of claims 14-25 ] -- it is carried out promptly and correctly and recycling of an electronic circuit board is promoted.

[0055]It becomes possible to classify the electronic circuit board according to the collection management technique of the precious metals by claim 15 or the invention of 21, since the content of the precious metals is known easily, and recycling of an electronic circuit board is promoted further.

[0056]Use of the lead-free soldering developed as a measure on the problem of the lead contained to waste is promoted by one invention of claims 26-31, and it can contribute to preservation of earth environment by it.

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TECHNICAL FIELD

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[Field of the Invention]This invention relates to recycling of an electronic circuit board especially about the apparatus by which the electronic circuit board and this electronic circuit board were provided. As such apparatus, a computer, computer-related peripherals, a copying machine, a facsimile, a printer, telephone, television, an electric washing machine, an air conditioner, etc. are typical.

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**PRIOR ART**

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[Description of the Prior Art](1) In the above mentioned apparatus, including the reuse of an electronic circuit board, i.e., a used electronic circuit board, in a new product, and carrying out a reuse is performed in the part.

[0003](2) The electrical part mounted in an electronic circuit board does not have few things containing the precious metals, such as gold, silver, platinum, and tungsten. For this reason, processing the electronic circuit board which was separated from apparatus and collected, and extracting and recycling the precious metals is performed.

[0004](3) Since lead which is one of the ingredients of the solder which connects between the circuits on an electronic circuit board is a harmful substance, When [ which lays on the shelf of an electronic circuit board ] it case or recycles, processing of lead has been a problem, and the solder which does not contain lead which is a harmful substance as a measure on this problem, i.e., Handaya which consists of silver / a tin system alloy, and the solder which consists of zinc / a tin system alloy are used in part.

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## EFFECT OF THE INVENTION

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[0054]ease [ judgment of the electronic circuit board which contains the precious metals by one invention of claims 14-25 ] -- it is carried out promptly and correctly and recycling of an electronic circuit board is promoted.

[0055]It becomes possible to classify the electronic circuit board according to the collection management technique of the precious metals by claim 15 or the invention of 21, since the content of the precious metals is known easily, and recycling of an electronic circuit board is promoted further.

[0056]Use of the lead-free soldering developed as a measure on the problem of the lead contained to waste is promoted by one invention of claims 26-31, and it can contribute to preservation of earth environment by it.

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## TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention](1) In the process of the reuse which carries out the reuse of the electronic circuit board, the propriety of the reuse was conventionally inspected about the total of the electronic circuit board which disassembled and classified apparatus. Therefore, the number of subjects of examination increased and there was a problem that working efficiency was low. The quality of the classified reuse electronic circuit board became irregular, and there was a problem of reducing the reliability of the apparatus by which the reuse electronic circuit board was incorporated.

[0006]The purpose of the 1st this invention is as follows.

Improve the judgment efficiency of a reuse electronic circuit board for the purpose of solving the aforementioned problem in the reuse of an electronic circuit board.

Improve the quality of the classified reuse electronic circuit board.

[0007](2) As a substance which the circuit on an electronic circuit board comprises a wire etc. which connect IC, a resistor, a capacitor, printed wiring, and a circuit element and printed wiring, and constitutes a circuit, That for which the precious metals other than ceramics, such as a silicon wafer, and copper, such as gold, silver, platinum, and tungsten, are used is not little. These precious metals are collected and recycled.

[0008]The electronic circuit board is various, such as what does not contain the precious metals, a thing which does not reach the content corresponding to recovery cost even if contained, and a thing of the content corresponding to recovery cost. The electronic circuit board which depends on experience of the worker who classifies an electronic circuit board, and intuition conventionally, and contains the precious metals was classified. For this reason, there was a problem that the accuracy of judgment was low and judgment work was not efficient.

[0009]The purpose of the 2nd this invention aims at solving the aforementioned problem in recovery of the precious metals from the conventional electronic circuit board.

[0010](3) The substance contained in an electronic circuit board is recycled, and when laying on the shelf of the remainder, or when laying on the shelf of an electronic circuit board, the lead contained in waste has been a problem.

[0011]Although lead is the main ingredients of the solder which connects between wiring, the solder which does not contain lead as a measure on the aforementioned problem, i.e., lead-free soldering, is developed. However, since it was difficult to distinguish from appearance the electronic circuit board which has the electronic circuit board which has lead content solder and the solder which does not contain lead, i.e., lead-

free soldering, it was difficult to classify the electronic circuit board which used lead-free soldering. For this reason, the advantage of lead-free soldering is not fully utilized, but there is a problem that use of lead-free soldering does not progress.

[0012]By making easy discrimination of an electronic circuit board which has lead-free soldering, the purpose of the 3rd this invention promotes use of lead-free soldering, and aims at contributing to solution of the environmental problem relevant to solder.

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[0008]The electronic circuit board is various, such as what does not contain the precious metals, a thing which does not reach the content corresponding to recovery cost even if contained, and a thing of the content corresponding to recovery cost. The electronic circuit board which depends on experience of the worker who classifies an electronic circuit board, and intuition conventionally, and contains the precious metals was classified. For this reason, there was a problem that the accuracy of judgment was low and judgment work was not efficient.

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[0011]Although lead is the main ingredients of the solder which connects between wiring, the solder which does not contain lead as a measure on the aforementioned problem, i.e., lead-free soldering, is developed. However, since it was difficult to distinguish from appearance the electronic circuit board which has the electronic circuit board which has lead content solder and the solder which does not contain lead, i.e., lead-

free soldering, it was difficult to classify the electronic circuit board which used lead-free soldering. For this reason, the advantage of lead-free soldering is not fully utilized, but there is a problem that use of lead-free soldering does not progress.

[0012]By making easy discrimination of an electronic circuit board which has lead-free soldering, the purpose of the 3rd this invention promotes use of lead-free soldering, and aims at contributing to solution of the environmental problem relevant to solder.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]It is a figure showing the electronic circuit board concerning the embodiment of the invention 1.

[Drawing 2]It is a figure showing the electronic circuit board concerning the embodiment of the invention 2.

[Drawing 3]It is a figure showing the electronic circuit board concerning the embodiment of the invention 3.

[Description of Notations]

A and B Hole

D, E, and G Field

F and H Label

PB Electronic circuit board

PC Circuit area

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[Translation done.]



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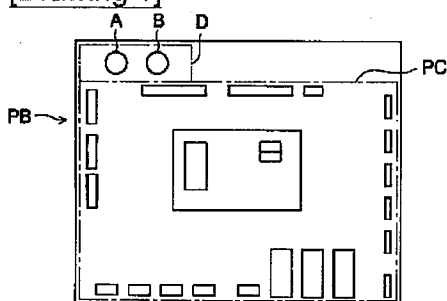
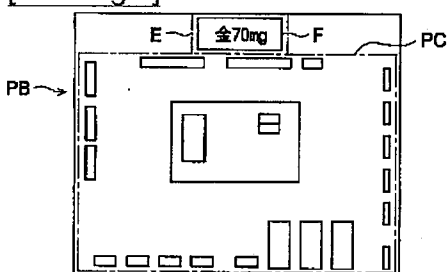
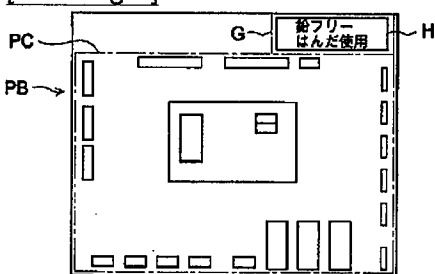
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**DRAWINGS**

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**[Drawing 1]****[Drawing 2]****[Drawing 3]**

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